HR Analysis & Performance Insights

Project Overview

This project focuses on analyzing HR data to understand employee performance, attrition, and workforce distribution. The main goal is to identify why employees leave the company and which departments, job roles, or locations are most affected.

A Power BI dashboard was created to show key HR metrics such as total employees, attrition rate, employee exits by department, performance level, and job role. The dashboard helps HR teams quickly understand trends and make better decisions to improve employee retention and performance.

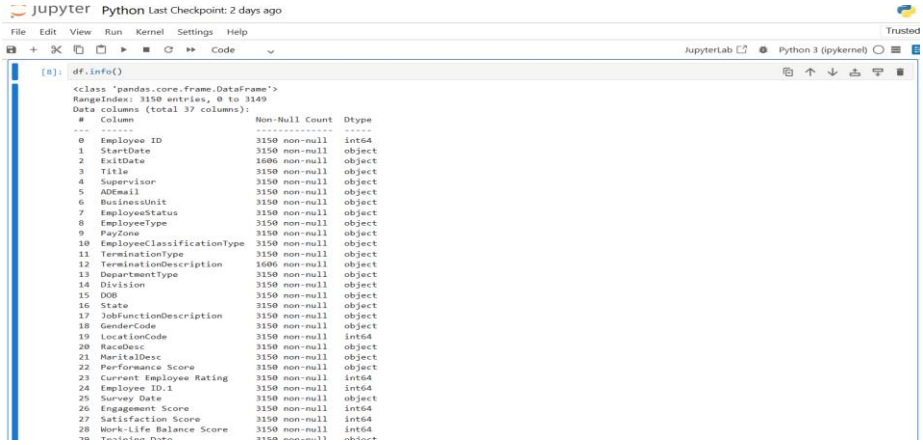
Dataset Description

This dataset contains HR employee information such as department, job role, gender, performance score, engagement score, start date, exit date, and attrition status.
The data was cleaned and analyzed using Python, SQL, and Power BI to build an interactive HR dashboard.

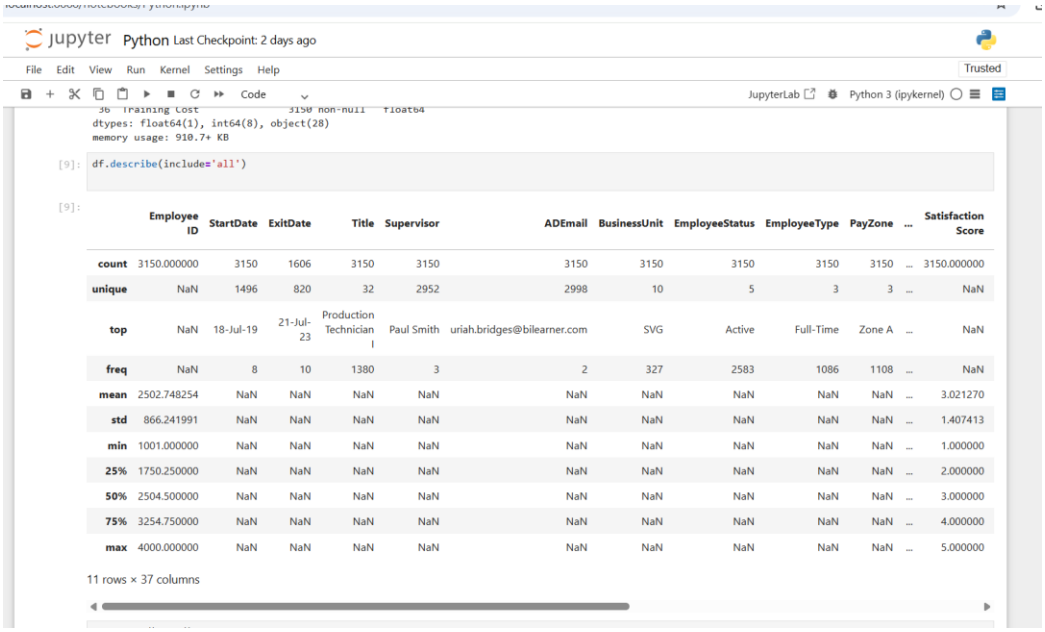
Exploratory Data Analysis using Python

Data preparation and cleaning were performed using Python:

1. **Data Loading**
   Loaded the HR dataset into Python using pandas.
2. **Data Understanding**
   Checked dataset structure, column names, and data types using df.info() and df.head().



3. **Summary Statistics**
   Used df.describe() to understand distributions of numerical columns like age, scores, and ratings.



	Employee ID	StartDate	ExitDate	Title	Supervisor	ADEmail	BusinessUnit	EmployeeStatus	EmployeeType	PayZone	...	Satisfaction Score
count	3150.000000	3150	1606	3150	3150	3150	3150	3150	3150	3150	...	3150.000000
unique	NaN	1496	820	32	2952	2998	10	5	3	3	...	NaN
top	NaN	18-Jul-19	21-Jul-23	Production Technician I	Paul Smith	uriah.bridges@bilearner.com	SVG	Active	Full-Time	Zone A	...	NaN
freq	NaN	8	10	1380	3	2	327	2583	1086	1108	...	NaN
mean	2502.748254	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	3.021270
std	866.241991	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	1.407413
min	1001.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	1.000000
25%	1750.250000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	2.000000
50%	2504.500000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	3.000000
75%	3254.750000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	4.000000
max	4000.000000	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	5.000000

11 rows × 37 columns

4. **Missing Value Check**
   Identified missing values and handled them appropriately to maintain data quality.

5. **Data Cleaning**
   Renamed columns to a standard format and fixed inconsistent values.

6. **Feature Engineering**
   Created new columns such as age, age_group, tenure_group, attrition, and performance_level.

7. **Data Validation**
   Verified the correctness of newly created columns.

8. **Data Export**
   Loaded the cleaned dataset into PostgreSQL for SQL analysis and Power BI reporting.

Data Analysis using SQL

We performed structured analysis in PostgreSQL to answer key HR business questions:

1. **Total Employees Who Left** – Counted the total number of employees who have exited the company.

2. **Department-wise Attrition –** Identified departments with the highest attrition rate.
3. **Gender-based Attrition –** Compared whether men or women are leaving the company more frequently.
4. **Location-wise Attrition –** Found offices or locations with the highest employee exits.
5. **Average Tenure Before Exit –** Calculated the average time employees stayed before leaving the company.
6. **New Joinees in Last Year/Quarter/Month –** Counted how many employees joined in recent periods.
7. **Performance Level vs. Attrition –** Checked if low-performing employees leave more than high-performing ones.
8. **Current Employees by Department –** Counted the number of active employees in each department.
9. **Job Roles with High Attrition** – Identified job roles or titles that experience the highest turnover.
10. **Supervisors with High Attrition Teams –** Found supervisors whose teams have the highest attrition rate.

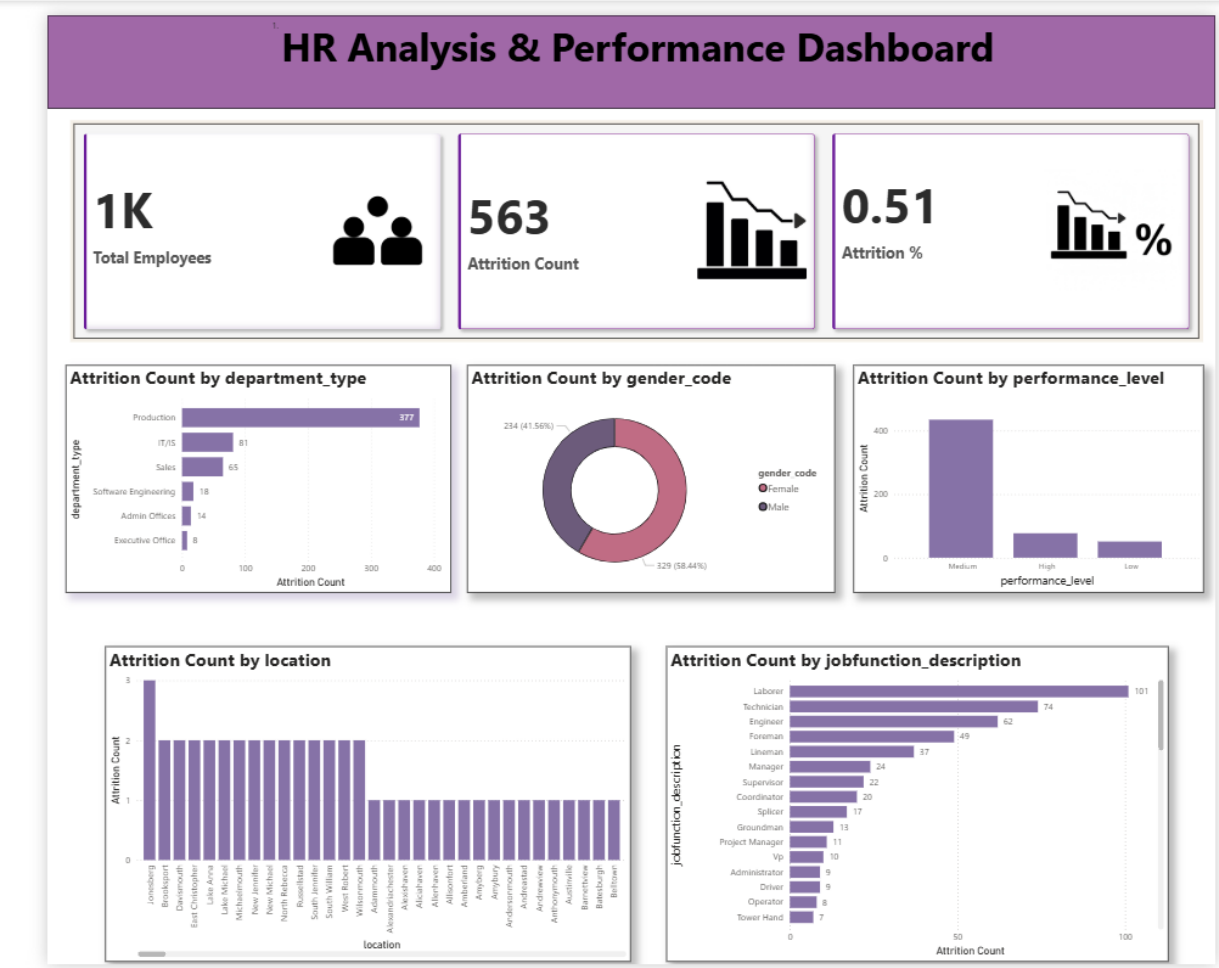
HR Analytics Dashboard – Power BI

Overview

Created an interactive HR dashboard in Power BI to help HR teams monitor workforce trends and make data-driven decisions.

Key Highlights

- **Employee Overview:** Shows total employees, number of exits, attrition rate, and average tenure.
- **Attrition Insights:**
    - Departments with highest exits
    - Male vs Female attrition
    - Performance level impact on attrition
- **Workforce Details:**
    - High-risk job roles
    - Locations with more employee exits



Business Recommendations

- Improve retention strategies in high-attrition departments
- Focus on employee engagement for low-performing groups
- Strengthen retention programs for early-tenure employees
- Monitor location-wise attrition trends regularly

Conclusion

The HR Analysis & Performance Dashboard provides a clear view of employee attrition, performance trends, and workforce distribution. Using Python, SQL, and Power BI, key HR metrics were analyzed and visualized to identify high-risk departments, job roles, and locations.This dashboard enables HR teams to make data-driven decisions for improving employee retention, performance management, and overall workforce planning.